

## CLAIMS

1. A process for producing fine metal oxide particles which process comprises subjecting a gaseous organometallic compound to combustion in a gas phase in the presence of an  
5 oxidizing substance.

2. A process for producing fine metal oxide particles which process comprises mixing a gaseous organometallic compound with an oxidizing substance to prepare a mixture and  
10 subjecting the mixture to combustion.

3. A process for producing fine metal oxide particles which process comprises mixing an organometallic compound solution with an oxidizing substance to prepare a mixture,  
15 making the mixture into a gaseous state and then subjecting the gaseous mixture to combustion.

4. A process for producing fine metal oxide particles which process comprises mixing an oxidizing substance with a  
20 gaseous organometallic compound prepared by vaporizing an organometallic compound solution to prepare a mixture and then subjecting the mixture to combustion.

5. The process for producing fine metal oxide particles

according to any one of claims 1 to 4 wherein the oxidizing substance comprises at least one selected from an oxygen-containing gas, oxygen, water and nitrous oxide.

5           6. The process for producing fine metal oxide particles according to any one of claims 1 to 4 wherein a combustion improver is used in the combustion of the organometallic compound and the oxidizing substance.

10           7. The process for producing fine metal oxide particles according to any one of claims 3 and 4 wherein the solvent of the organometallic compound solution is a combustion improver.

          8. The process for producing fine metal oxide particles  
15 according to any one of claims 1 to 4 wherein the organometallic compound comprises at least a metal, a carbon and a hydrogen atom.

          9. The process for producing fine metal oxide particles  
20 according to any one of claims 1 to 4 wherein the organometallic compound comprises at least one compound selected from an alkyl metal compound, a metal alkoxide and a  $\beta$ -diketone metal complex.

10. The process for producing fine metal oxide particles according to claim 9 wherein an alkyl group of the alkyl metal compound has 1 to 10 carbon atoms.

5 11. The process for producing fine metal oxide particles according to claim 9 wherein the metal alkoxide is a metal methoxide, ethoxide, n-propoxide, i-propoxide, n-butoxide, sec-butoxide, tert-butoxide or t-amylxide.

10 12. The process for producing fine metal oxide particles according to claim 9 wherein the  $\beta$ -diketone metal complex is a metal complex of 2,2,6,6-tetramethylheptane-3,5-dione, 2,6-dimethyl-3,5-heptanedione or 2,4-pentanedione.

15 13. The process for producing fine metal oxide particles according to any one of claims 3 and 4 wherein the solvent of the organometallic compound solution is at least one solvent selected from methyl alcohol, ethyl alcohol, 20 propyl alcohol, butyl alcohol, tetrahydrofuran, dimethyl sulfoxide, dimethylformamide, hexane, cyclohexane, methylcyclohexane, dioxane, acetone, ethyl acetate, butyl acetate, methyl isobutyryl ketone, diethyl ether, t-butyl methyl ether, acetyl acetone, diisobutyryl methane and

dipivaloyl methane.

14. The process for producing fine metal oxide particles according to any one of claims 1 to 4 wherein the  
5 combustion temperature is not lower than 400°C.

15. The process for producing fine metal oxide particles according to any one of claims 1 to 4 wherein the oxidizing substance is used in a molar amount of from 0.5 to  
10 40 times the molar amount of oxygen required for complete oxidization of the organometallic compound and the solvent of the organometallic compound solution.

16. The process for producing fine metal oxide  
15 particles according to any one of claims 1 to 4 wherein the fine metal oxide particles produced have a number average particle diameter of not more than 100 nm.

17. The process for producing fine metal oxide  
20 particles according to any one of claims 1 to 4 wherein the fine metal oxide particles produced are phosphors.

18. The process for producing fine metal oxide particles according to claim 17 wherein the phosphor is at least

one red phosphor selected from  $Y_2O_3:Eu$ ,  $(Y, Gd)_2O_3:Eu$ ,  $YBO_3:Eu$  and  $(Y, Gd)BO_3:Eu$ .

19. The process for producing fine metal oxide  
5 particles according to claim 18 wherein the boron source of  $YBO_3:Eu$  or  $(Y, Gd)BO_3:Eu$  is a borate.

20. The process for producing fine metal oxide  
particles according to claim 17 wherein the phosphor is at least  
10 one green phosphor selected from  $Y_2O_3:Tb$ ,  $Zn_2SiO_4:Mn$  and  $(Mg, Sr, Ba)Al_{12}O_{19}:Mn$ .

21. The process for producing fine metal oxide  
particles according to claim 17 wherein the phosphor is at least  
15 one blue phosphor selected from  $Y_2O_3:Tm$  and  $(Ba, Mg)Al_{10}O_{17}:Eu$ .

22. The process for producing fine metal oxide  
particles according to any one of claims 1 to 4 wherein the  
20 fine metal oxide particles produced are conductive materials.

23. The process for producing fine metal oxide  
particles according to claim 22 wherein the conductive  
materials comprise tin oxide or tin oxide added indium oxide.

24. The process for producing fine metal oxide particles according to any one of claims 1 to 4 wherein the fine metal oxide particles produced are ferroelectric substances.

25. The process for producing fine metal oxide particles according to claim 24 wherein the ferroelectric substances comprise barium titanate, strontium titanate, lead titanate, barium strontium titanate, lead zirconium titanate, lead lanthanum zirconium titanate or strontium bismuth tantalum oxide.